CLAIMS

~~1.~~ A thermistor element comprising a mixed sintered body $M^1M^2O_3 \cdot Y_2O_3$ of a composition $M^1M^2O_3$ and Y_2O_3, wherein M^1 is at least one element selected from the elements of the groups IIA and IIIA excluding La in the Periodic Table, and M^2 is at least one element selected from the elements of the groups IIB, IIIB, IVA, VA, VIA, VIIA and VIII.

2. A thermistor element according to claim 1, wherein a and b satisfy the relations $0.05 \leqq a < 1.0$, $0 < b \leqq 0.95$ and $a + b = 1$, where said a is a molar fraction of $M^1M^2O_3$ ~~and~~ said b is a molar fraction of Y_2O_3.

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3. A thermistor element according to claim ~~1 or~~ 2, wherein said M^1 is at least one element selected from Y, Ce, Pr, Nd, Sm, Eu, Gd, Dy, Ho, Er, Yb, Mg, Ca, Sr, Ba and Sc, and said M^2 is at least one element selected from Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Al, Ga, Zr, Nb, Mo, Hf, Ta and W.

4. A thermistor element according to claim 3, wherein said M^1 is Y, said M^2 are Cr and Mn, and said mixed sintered body is $Y(CrMn)O_3 \cdot Y_2O_3$.

5. A thermistor element according to claim 3, wherein said M^1 is Y, said M^2 are Cr, Mn and Ti, and said mixed sintered body is $Y(CrMnTi)O_3 \cdot Y_2O_3$.

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6. A thermistor element according to any one of claims 1 ~~to 5~~, further comprising a sintering auxiliary composed of at least one of CaO, $CaCO_3$ and $CaSiO_3$, and SiO_2.

7. A temperature sensor comprising the thermistor element of claim 1.

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8. A method of producing the thermistor element of claim 1, which comprises performing calcination to obtain $M^1M^2O_3$ having an average particle diameter larger than that of said Y_2O_3;

mixing said $M^1M^2O_3$ with said Y_2O_3; grinding the mixture to adjust an average particle diameter of the mixture after grinding to an average

particle diameter which is not more than that of said Y_2O_3 before mixing; molding the mixture into an article having a predetermined shape; and sintering the article.

9. A method of producing the thermistor element of claim 4, which comprises mixing an oxide of Cr with an oxide of Mn; calcining the mixture at 1000℃ or more to obtain $(Mn_{1.5}Cr_{1.5})O_4$ having an average particle diameter larger than that of said Y_2O_3; mixing said $(Mn_{1.5}Cr_{1.5})O_4$ with said Y_2O_3; grinding the mixture to adjust an average particle diameter of the mixture after grinding to an average particle diameter which is not more than that of said Y_2O_3 before mixing; molding the mixture into an article having a predetermined shape; and sintering the article.

10. A method of producing the thermistor element of claim 5, which comprises mixing an oxide of Cr with an oxide of Mn; calcining the mixture at 1000℃ or more to obtain $(Mn_{1.5}Cr_{1.5})O_4$ having an average particle diameter larger than that of said Y_2O_3; mixing said $(Mn_{1.5}Cr_{1.5})O_4$, said Y_2O_3, and TiO_2; grinding the mixture to adjust an average particle diameter of the mixture after grinding to an average particle diameter which is not more than that of said Y_2O_3 before grinding; molding the mixture into an article having a predetermined shape; and sintering the article.

11. A method of producing a thermistor element of claim 1, which comprises mixing a raw material of said M^2 with a raw material of said M^1; grinding the mixture to adjust an average particle diameter of the mixed grind after grinding to an average particle diameter which is not more than that of the raw material of said M^1 before mixing and is not more than 0.5 μ m; calcining the mixed grind to obtain said $M^1M^2O_3$; mixing said $M^1M^2O_3$ obtained by said calcination with said Y_2O_3; molding the mixture into an article having a predetermined shape; and sintering the article.

12. A method of producing a thermistor element of claim 1, which comprises using those containing at least Y_2O_3 as a raw material of said M^1; mixing a raw material of said M^2 with the raw material of said M^1; grinding the mixture to adjust an average particle diameter of the mixed grind after grinding to an average particle diameter which is not more than that of the raw material of said M^1 before mixing and is not more than 0.5 μ m; calcining the mixed grind to obtain a precursor having the same composition as that of said mixed sintered body $M^1M^2O_3 \cdot Y_2O_3$;

molding said precursor obtained by said calcination into an article having a predetermined shape; and sintering the article.

13. A method of producing a thermistor element of claim 1, which comprises mixing a raw material of said M^2 with a raw material of said M^1; grinding the mixture to adjust an average particle diameter of the mixed grind after grinding to an average particle diameter which is not more than that of the raw material of said M^1 before mixing and is not more than 0.5 μ m; calcining the ground mixture to obtain said $M^1M^2O_3$;

mixing said $M^1M^2O_3$ obtained by said calcination with said Y_2O_3; grinding the mixture to adjust an average particle diameter of the mixture after grinding to an average particle diameter which is not more than that of the raw material of said Y_2O_3 before mixing; molding the ground mixture into an article having a predetermined shape; and sintering the article.

14. A method of producing a thermistor element of claim 1, which comprises using those containing at least Y_2O_3 as a raw material of said M^1;
mixing a raw material of said M^2 with the raw material of said M^1; grinding the mixture to adjust an average particle diameter of the mixed grind after grinding to an average particle diameter which is not more than that of the raw material of said M^1 before mixing and is not more than 0.5

μ m; calcining the ground mixture to obtain a precursor having the same composition as that of said mixed sintered body $M^1M^2O_3 \cdot Y_2O_3$;

grinding said precursor obtained by said calcination to adjust an average particle diameter of said precursor after grinding to an average particle diameter which is not more than that of the raw material Y_2O_3 as the raw material of said M^1 before mixing; molding the ground precursor into an article having a predetermined shape; and ~~sintering the article.~~

15. A wide-range type thermistor element comprising a mixed sintered body $M^1(M^2M^3)O_3$, wherein M^1 is at least one element selected from the elements of the groups II and IIIA excluding La in the Periodic Table, and M^2 and M^3 respectively represent at least one element selected from the elements of the groups IVA, VA, VIA, VIIA and VIIIA; and wherein

a and b satisfy the relations $a + b = 1$ and $0 < b < 0.1$ and, where said a is a molar fraction of M^2 and b is a molar fraction of M^3 in said $M^1(M^2M^3)O_3$.

16. A wide-range type thermistor element, wherein said M^1 is at least one element selected from Y, Ce, Pr, Nd, Sm, Eu, Gd, Dy, Ho, Er, Yb, Mg, Ca, Sr, Ba and Sc, and said M^2 and M^3 respectively represent at least one element selected from Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Al, Ga, Zr, Nb, Mo, Zr, Hf, Ta and W.

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17. A wide-range type thermistor element according to claim 15 ~~or 16~~, wherein said M^1 is Y, said M^2 are Cr and Mn, said M^3 is Ti, and said $M^1(M^2M^3)O_3$ is $Y(CrMnTi)O_3$.

18. A wide-range type thermistor element according to claim 15, further comprising a sintering auxiliary composed of at least one of CaO, $CaCO_3$ and $CaSiO_3$, and SiO_2.

19. A wide-range type temperature sensor comprising the thermistor element of claim 15.

20. A wide-range type thermistor element according to claim 16, further comprising a sintering auxiliary

composed of at least one of CaO, $CaCO_3$ and $CaSiO_3$, and SiO_2.

21. A wide-range type temperature sensor comprising the thermistor element of claim 16.

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